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HELMET DETECTION AND LICENSE PLATE RECOGNITION

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ABSTRACT

Currently, riding a motorcycle without a helmet is a traffic offense in India, leading to an increase in accidents and deaths. For reasons of public safety, the government has made it a law that all motorcyclists must wear a helmet when riding a motorcycle. However, most people are still against this and ride the car without a helmet. To address this problem, this paper proposes an approach for automatic detection of helmetless motorcyclists and license plate recognition using real-time surveillance videos. For detection, the system uses the YOLO deep learning framework. For classification, an SVM algorithm is used to recognize motorcycle license plates using images or videos captured by a camera. It includes various steps such as vehicle classification, pre-processing and license plate recognition. To prevent accidents and ensure public safety, we need a system that automatically detects people who are not wearing helmets and extracts license plates to help motorcyclists who are subject to fines. This helps the traffic police to catch offenders and can be used to issue data fines to riders who repeatedly make the mistake of not wearing a helmet.

Keywords: YOLO, Convolutional Neural Network, SVM, OCR.

INTRODUCTION

Motorcycle is a popular means of transportation in almost all countries. However, the lack of protection carries significant risks. To reduce the associated risks, cyclists are strongly encouraged to wear helmets. Motorcycles lead in the number of traffic accidents. Although reckless and inattentive driving is the main cause of these accidents, brain injuries are the leading cause of death from car accidents. Research shows that more than a third of people in road accidents could have survived if they had worn a helmet, and wearing a helmet can reduce 30 to 40 deaths from accidents. Helmets are a concern. According to the National Police Agency's annual report (published in 2017), 35-40% of fatal crashes result in death.

METHODOLOGY

Dataset Gathering and pre-processing.

The live feed captured from the Traffic Cameras will be provided as the dataset. Now inside the model first we need to pre-process the video frames by techniques such as.

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•Noise reduction: - Image noise is random variation of brightness or colour information in images, and is usually an aspect of electronic noise.

•Gradient calculation: - Gradient magnitude represents the strength of the change in the intensity level of the image.

•Image Sharpening: - Image sharpening is an effect applied to digital images to give them a sharper appearance.

Object detection

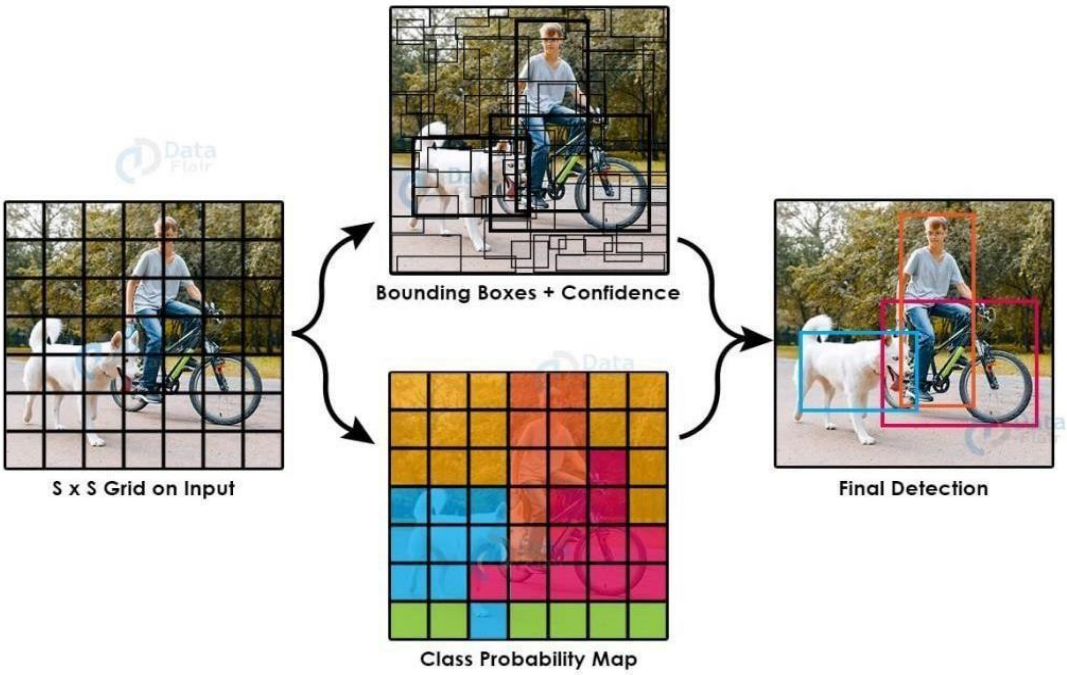

Figure 2: Working Of YOLO

The first step is to detect the objects by using Localization. Object localization is a fundamental practical task in Computer Vision, which aims to locate the target within the image or video. It has been used in many applications, including human face recognition, retail checkout recognition, automated driving, and automatic monitoring systems.Then the algorithm we are using to detect objects is YOLO. YOLO algorithm employs convolutional neural networks (CNN) to detect objects in real-time. As the name suggests, the algorithm requires only a single forward propagation through a neural network to detect objects.First, as shown in fig.2 the image is divided into grid cells. Each grid has a dimension of S X S. Each grid cell forecasts B bounding boxes and provides their confidence scores. By use of these algorithms, we will detect a rider, helmet and number plate. All the predictions are made simultaneously using a convolutional neural network. Intersection over union ensures that the predicted bounding boxes are equal to the real boxes of the objects. This phenomenon eliminates unnecessary bounding boxes that do not meet the characteristics of the objects (like height and width).

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The final detection will consist of unique bounding boxes that fit the objects perfectly. Hence the two-wheelers, helmets and number plates will be detected and passed to the next step.

Object Classification

After helmet and motorbike detection, in this stage we will apply the classification methods to distinguish between the two-wheeler and the other moving objects and also classify the biker is wearing the helmet or not. The Number plate is then accessed only if the rider is not wearing the helmet.

For classification purpose we will use support vector machine algorithm. SVM (support vector machine) chooses the extreme points/vectors that help in creating the hyperplane and finds the closest point of the lines from both the classes and then make categorization. After this if the helmetless rider is detected then the number plate is extracted of that bike. Finally, as shown in fig. 3 the motorcycle and helmet are detected.

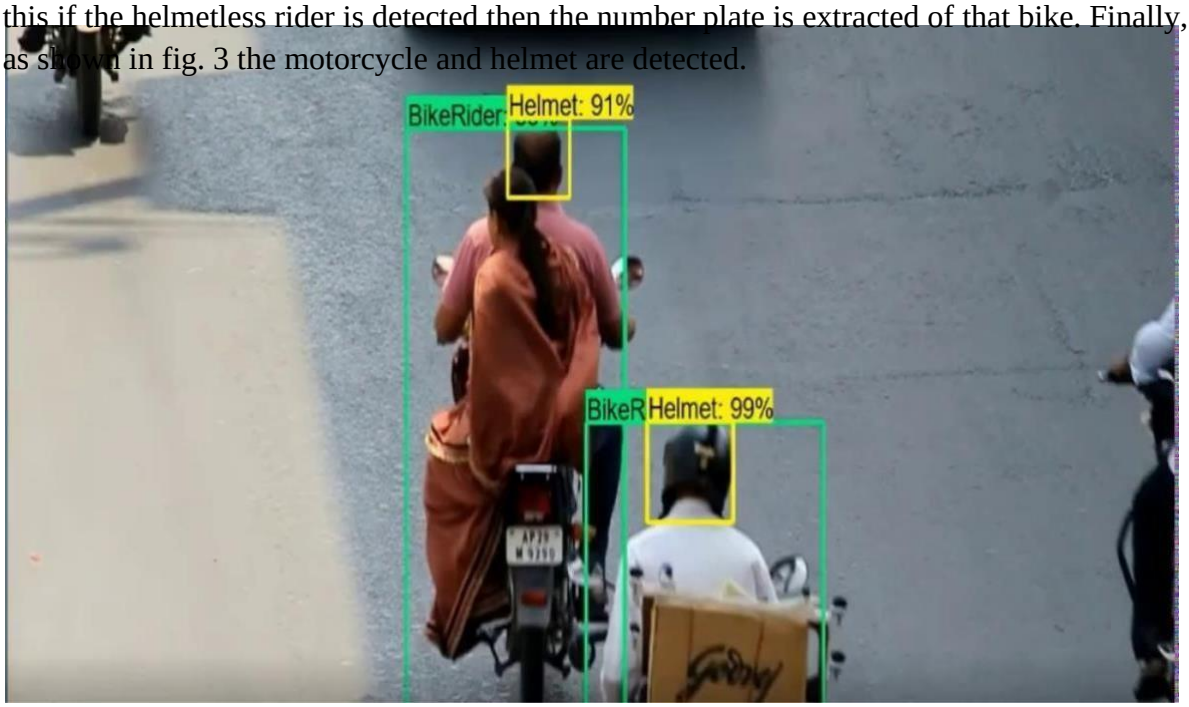

Figure 3: Detection of frame with helmet and bike

DISCUSSION

We propose a system for automatic detection of motorcycle riders without helmets from CCTV video and automatic retrieval of license plates for these motorcyclists. The existing system needs human assistance, which is a difficult task. This system will mainly use object detection principles with YOLO architecture to detect helmet and license plate from input given in the form of video or image, and the system recognizes motorcyclists who drive without a helmet. Using Optical Character Recognition (OCR), license plate details are retrieved and stored in a database. The method will ensure that it will reduce complexity as well as time and save many lives by forcing riders to wear helmets while traveling on two-wheelers and this system will help the traffic police in nabbing helmetless riders without being physically present on the course. .

CONCLUSION

This model focuses on catching bikers without helmets. The existing video monitoring system is effective, but requires significant human assistance, the effectiveness of which decreases over time, so we want to automate it. First, the system classifies moving objects as either motorized or non-motorized. In addition, if the system detects a motorcyclist without a helmet, it will finally pull the license plate number of the vehicle. This will help the traffic authority to accurately identify each offender and impound the suspect's vehicle, thereby issuing fines for violations. Our model thus increases the speed of real-time operations using the YOLO and OCR methods.

CONFIRMATION

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